



PATENT  
Docket No. 509952000100

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:  
Edward Y. CHANG, et al.

Application No.: 10/032,319

Group Art Unit: 2171

Filed: December 21, 2001

Examiner: E. P. LeRoux

For: MAXIMIZING EXPECTED  
GENERALIZATION FOR LEARNING  
COMPLEX QUERY CONCEPTS

**Declaration of Gang Wu Pursuant to 37 C.F.R § 1.132**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

I, Gang Wu, declare as follows:

1. I am currently a graduate student in the Electrical & Computer Engineering Department at the University of California, Santa Barbara.
2. I have no association with VIMA Technologies Inc., assignee of the above-referenced patent application.
3. Before joining UCSB, I received a B.S. and an M.S. in Electrical Engineering and Computer Engineering, respectively, from Xi'an Jiaotong University, China. In my junior and senior years, I took Artificial Intelligence, Statistics, and Machine Learning courses. Since joining UCSB, in September 2001, I have been working as a graduate-student researcher conducting research in the field of Artificial Intelligence (AI) and Machine Learning.
4. I have reviewed the above-referenced patent application including claims, and I am familiar with and understand the contents of the application as originally filed.

5. The field of technology to which the above-referenced patent application pertains is AI and Machine Learning.

6. AI and Machine Learning is the field of technology in which I have focused my education, studies and work, and I consider myself to be a person having ordinary skill in that field.

7. I am familiar with Conjunctive Normal Format (CNF) and Disjunctive Normal Format (DNF) and with the use of k-CNF and k-DNF expressions in the field of AI and Machine Learning. A k-CNF expression is the conjunction of disjunctive clauses that consist of at most k predicates. A k-DNF is the disjunction of conjunctive clauses that consist of at most k predicates.

8. It is my opinion that a person having ordinary skill in the field of AI and Machine Learning is familiar with the use of k-CNF and k-DNF expressions.

9. It is my opinion that a person having ordinary skill in the art of AI and Machine Learning knows how to use a k-CNF and k-DNF to express a concept or an object using predicates (or features). Since an image-query concept is a concept about some images, it is natural to express an image-query concept using image features such as color, texture and shape. For example, a "cloud" image concept can be expressed in 2-CNF as (color = blue or color = white) and (shape = roundish or texture = fine).

10. It is my opinion that a person having ordinary skill in the field of AI and Machine Learning knows how to use k-CNF and k-DNF expressions together to define a query concept candidate space.

11. It is my opinion that a person having ordinary skill in the field of AI and Machine Learning knows that a k-CNF expression is often used to specify the most specific concept in a query concept candidate space; that a k-DNF expression is often used to specify the most general concept in the query concept candidate space; and that Machine Learning algorithms often learn a target concept by modifying the most specific k-CNF expression and the most general k-DNF so that the candidate concept space is shrunk gradually so as to converge upon the target concept.

12. It is my opinion that the above-referenced patent application provides sufficient disclosure to enable a person having ordinary skill in the field of AI and Machine Learning to use k-CNF and k-DNF expressions to practice the invention described in the claims of the above-referenced patent application.

13. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statement may jeopardize the validity of the application, and patent issuing thereon, or any patent to which this verified statement is directed.

Nov. 21, 2003

Date

Gang Wu  
Gang Wu